



Oregon

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Lance Kruzic
NOAA Fisheries
2900 NW Stewart Parkway
Roseburg, OR 97470

Dear Lance:

I am pleased to provide NOAA Fisheries with the second annual report regarding fisheries management and evaluation for 2002 Willamette River spring chinook. The annual report is a requirement of ODFW's *Fisheries Management and Evaluation Plan-Upper Willamette Spring Chinook in Freshwater Fisheries of the Willamette Basin and Lower Columbia River Mainstem and NMFS'* subsequent concurrence letter.

The 2002 Willamette spring chinook return was 121,700, the largest since 1990, and likely the third largest return since at least 1946. The percentage of wild fish was about 10%, similar to the preseason expectation. The actual number of wild fish, about 12,200, was also the highest in years. The escapement of wild fish over Leaburg Dam on the McKenzie River was 4,100, the highest since separate counts of wild and hatchery fish were begun in 1994, and likely the highest since 1990. The number of wild fish passing North Fork Dam on the Clackamas River was 2,300 fish, also the highest count in years. The redd count in the North Santiam River dropped in 2002 to 306 redds in the index area, but was still well above average.

Fisheries management was a success in 2002. All sport fisheries were restricted to hatchery fish only. The Columbia River was opened in April for only the second time since 1977. Even though the target species was adipose fin-clipped upriver hatchery spring chinook, 5,100 Willamette hatchery spring chinook were retained. Lower Willamette spring chinook anglers enjoyed their second consecutive full fishery since 1995. A total of 89,400 angler trips were made to catch 13,600 fish of which 10,500 hatchery fish were retained. Angler compliance with regulations was high. The Willamette tributaries were also open for full seasons for hatchery spring chinook.

The inaugural full fleet selective Columbia River commercial fishery for hatchery spring chinook occurred in 2002. A total of 14,200 hatchery spring chinook were landed including 5,400 Willamette fish.

Freshwater fishery impacts to 2002 Willamette wild spring chinook were considerably under the 15% limit established in the FMEP. The estimates by population are 11.3%, 9.2%, and 7.7% for the Clackamas, North Santiam, and McKenzie, respectively.

The 2003 Willamette spring chinook return is forecasted to be 109,800 including 11,000 (10%) wild fish. All freshwater sport and commercial fisheries will again be selective in 2003. The cumulative fishery impact is expected to not exceed the average annual rate of 15% provided in the FMEP.

I look forward to another successful year of Willamette spring chinook fishery management. Please do not hesitate to contact me at any time regarding Willamette spring chinook.

Sincerely,

Steven D. King
Salmon Fishery Manager

SDK:smb
Attachment

c: Rob Jones (NMFS – Portland)
R. Klumph (ODFW – Director's Office)
E. Bowles (ODFW – Fish Division Administrator)
N. Coenen (ODFW – IJFMP Manager)
C. Wheaton (ODFW – NW Region Director)

Fisheries Management and Evaluation for 2002 Willamette River Spring Chinook

Introduction

In February 2001, the Oregon Department of Fish and Wildlife (ODFW) submitted a Fisheries Management and Evaluation Plan (FMEP) for upper Willamette spring chinook salmon to the National Marine Fisheries Service (NMFS) under limit number 4 of the 4(d) Rule for the upper Willamette River (ODFW 2001). Upper Willamette River wild spring chinook salmon were listed as a threatened species under the federal Endangered Species Act (ESA) in May 1999.

The NMFS evaluated ODFW's FMEP and determined the FMEP adequately addressed all of the criteria specified in limit number 4 of the Rule. Thus, take prohibitions under Section 9 of the ESA and applicable 4(d) Rule do not apply to fishery harvest activities provided such fisheries are managed in accordance with the FMEP.

The FMEP requires all freshwater fisheries for Willamette spring chinook to be selective to hatchery fish. Willamette hatchery spring chinook have been mass-marked with an adipose fin clip beginning with the 1997 brood. About 96% of the returning Age 3-5 hatchery spring chinook in 2002 bore the adipose fin clip. Returning age 6 hatchery fish were not mass-marked but comprised only 0.5% of the 2002 return. All age classes (3-6) will return as mass marked in 2003. The FMEP limits the total fishery impact to an annual average rate of 15% or less in combined freshwater fisheries. This fishery impact rate limit on Willamette wild spring chinook ensures the survival and rebuilding of wild populations.

The FMEP indicates ODFW will complete an annual report that includes a summary of the previous year's run, fisheries, spawning escapement, fishery mortality estimates, and fishing plans for the coming year. The report is due January 31 each year to NMFS.

2002 Willamette Spring Chinook Run

The 2002 Willamette spring chinook return was 121,700 fish to the mouth of the Columbia River. It was the largest return since 1990, and likely the third largest return since 1946 when run size accounting began (Table 1 and Figure 1). The return continued a progression of improved returns since the near record-low returns of 35,000 fish in 1996 and 1997.

Table 1. Willamette River spring chinook returns and lower Willamette recreational harvest, 1946-2002.

Year	Run Entering	Run Entering	Falls	Mortalities	Run Entering	Lower Willamette Sport Fishery					
	Columbia	Willamette ¹	Count	Below Falls ²	Clackamas R.	L. Willamette	Days	Catch Per	Harvest	Wild Fish	Trips Per
						Sport Catch ³	Fished ⁴	Trip	Rate	Impact	Fish
1946		68,600	53,000		3,000	12,600	61,900	0.20	18%		4.9
1947		59,000	45,000		2,000	12,000	91,900	0.13	20%		7.7
1948		40,100	30,000		1,800	8,300	83,600	0.10	21%		10.1
1949		37,900	27,000		1,800	9,100	85,500	0.11	24%		9.4
1950		24,800	14,500		1,500	8,800	73,400	0.12	35%		8.3
1951		49,600	34,300		2,000	13,300	92,600	0.14	27%		7.0
1952		67,500	52,200		2,800	12,500	91,100	0.14	19%		7.3
1953		96,800	76,400		4,000	16,400	102,800	0.16	17%		6.3
1954		44,400	31,100		1,800	11,500	104,100	0.11	26%		9.1
1955		32,500	22,000		1,500	9,000	77,700	0.12	28%		8.6
1956		77,600	58,600		3,000	16,000	84,100	0.19	21%		5.3
1957		52,800	39,300		2,000	11,500	95,500	0.12	22%		8.3
1958		62,800	45,200		2,100	15,500	137,900	0.11	25%		8.9
1959		53,400	31,900		3,000	18,500	134,100	0.14	35%		7.2
1960		24,200	14,400		1,800	8,000	92,300	0.09	33%		11.5
1961		27,500	18,900		2,200	6,400	75,100	0.09	23%		11.7
1962		38,200	26,000	100	3,000	9,100	74,000	0.12	24%		8.1
1963		48,100	30,300	200	4,000	13,600	84,800	0.16	28%		6.2
1964		58,400	36,300		3,500	18,600	118,700	0.16	32%		6.4
1965		41,100	29,100		3,000	9,000	74,000	0.12	22%		8.2
1966		44,000	28,200		3,000	12,800	85,700	0.15	29%		6.7
1967		74,400	56,200		3,000	15,200	92,500	0.16	20%		6.1
1968		47,500	31,500	500	2,000	13,500	91,800	0.15	28%		6.8
1969		52,600	33,700	100	2,500	16,300	99,000	0.16	31%		6.1
1970	65,500	53,500	34,200		1,500	17,700	118,800	0.15	33%		6.7
1971	80,900	67,400	44,600	600	2,200	20,000	112,800	0.18	30%		5.6
1972	58,400	47,100	26,200	200	2,200	18,500	91,200	0.20	39%		4.9
1973	70,700	54,500	42,000	300	2,200	10,000	90,300	0.11	18%		9.0
1974	82,400	71,800	44,500	100	2,200	25,000	154,000	0.16	35%		6.2
1975	40,800	32,800	19,100	100	1,100	12,500	143,800	0.09	38%		11.5
1976	45,100	40,800	22,100	100	2,200	16,400	149,100	0.11	40%		9.1
1977	64,400	58,100	40,000	100	4,000	14,000	126,400	0.11	24%		9.0
1978	83,330	71,400	47,500	100	4,000	19,800	157,600	0.13	28%		8.0
1979	49,200	44,600	26,600	100	5,000	12,800	132,700	0.10	29%		10.4
1980	43,300	42,400	27,000		8,500	7,000	83,600	0.08	17%		11.9
1981	56,300	48,600	30,100		8,000	10,500	124,300	0.08	22%		11.8
1982	78,000	72,500	46,200	100	7,300	18,900	142,900	0.13	26%		7.6
1983	62,200	55,100	30,600	300	10,400	13,800	136,100	0.10	25%		9.9
1984	84,200	74,500	43,500	400	11,300	19,400	136,900	0.14	26%		7.1
1985	68,100	57,100	34,500	400	6,600	15,500	185,600	0.08	27%		12.0
1986	73,600	62,500	39,200	400	7,900	15,000	171,900	0.09	24%		11.5
1987	93,600	82,900	54,800	500	8,700	18,800	173,500	0.11	23%		9.2
1988	118,100	104,000	70,500	200	8,700	24,600	209,700	0.12	24%		8.5
1989	114,900	102,000	69,200	200	8,400	24,200	186,200	0.13	24%		7.7
1990	130,600	106,300	71,300	600	11,500	23,000	200,400	0.11	22%		8.7
1991	109,900	95,300	52,500	400	11,900	30,500	235,800	0.13	32%		7.7
1992	75,000	68,000	42,000	1,000	11,500	13,500	188,500	0.07	20%		14.0
1993	65,900	63,900	32,000	400	10,800	20,700	174,100	0.12	32%		8.4
1994	49,600	47,200	26,100	1,400	7,500	11,500	155,700	0.07	24%		13.5
1995	42,600	42,500	20,600	600	6,600	14,700	145,300	0.10	35%		9.9
1996	34,800	34,600	21,600	1,100	5,900	6,100	63,800	0.10	18%		10.5
1997	35,300	35,000	26,900	400	5,800	1,900	15,000	0.13	5%		7.9
1998	45,100	45,000	34,500	300	7,400	2,800	34,500	0.08	6%		12.3
1999	54,200	53,900	40,400	600	7,400	5,500 ⁵	45,400	0.12	10%		8.3
2000	57,500	56,100	39,100	300	7,700	11,400 ⁶	76,100	0.15	16%	14.0%	6.7
2001	80,400	73,000	54,000	600	10,800	12,400 ⁷	101,500	0.12	10%	2.1%	8.2
2002	121,700	109,000	83,100	600	14,400	13,600	89,400	0.15	10%	3.0%	6.6

¹ Tribal Fishermen harvested 759, 29, and 12 chinook at Willamette Falls in 1994, 1995, and 1996 respectively.

² Number of mortalities below Willamette Falls includes fish estimates for predation by sea lions. For 1997, 1998, 1999, 2000, and 2001, the estimated take was 141, 150, 348, 138, and 70 respectively.

³ Catch totals include estimates for the mainstem Willamette bank fishery in 1947, and 1951-2001. Clackamas catch is included from 1950-70 and Eagle Creek catch is included from 1962-70. Clackamas River catch averaged 100 to 200 fish for these years.

⁴ No estimate for number of days fished was made for the L. Willamette bank fishery of 1946-74.

⁵ Total catch of 11,382 includes, 8,712 kept, and 2,670 released. Hook and release mortality estimate is 299.

⁶ Total catch of 12,362 includes, 6,969 kept, and 5,393 released. Hook and release mortality estimate is 706.

⁷ Total catch of 13,635 includes, 10,457 kept, and 3,178 released. Wild fish hook and release mortality estimate is 369.

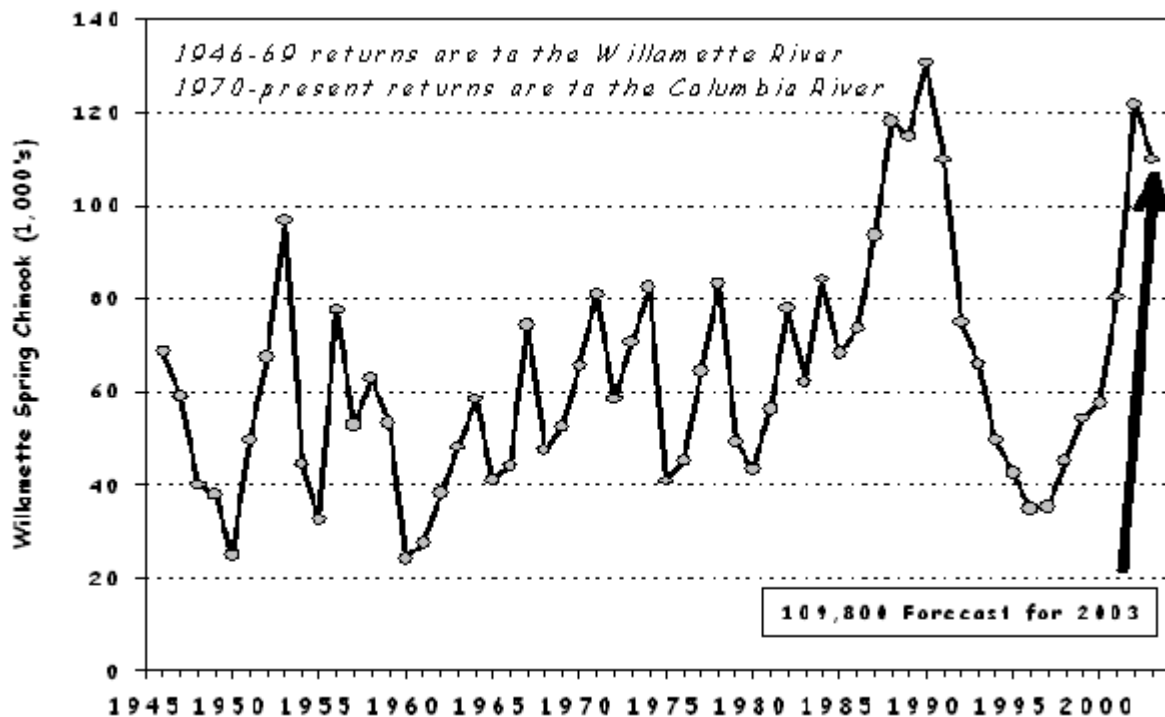


Figure 1. Historic Willamette spring chinook returns and this year's forecast.

Notes

1. The total 2002 return of 121,700 exceeded the upper error bound by 14%. Bounds were 80% statistical confidence intervals based on regression error terms. Last year's run was 65% greater than the forecast. The 2002 return was the second largest on record, exceeded only by the 130,600 in 1990.
2. This year's forecast of 109,800 is based on the same linear regression models used for 2002.
3. It is currently not possible to forecast the wild component of the 2003 run. For management purposes staff will assume 10% of the 2003 run would be wild fish. This is similar to recent observations for wild fish contribution.
4. The uncertainty in run size forecasts is estimated based on confidence limits from the regression models and cohort estimators.
5. The 2003 forecast of 18,400 age 4 fish represents a 40% decrease from the 2002 forecast and is only 21% of the actual 2002 return.
6. The 2003 forecast of 89,200 age 5 fish is almost twice the 2002 forecast and three times the actual 2002 return. Moreover, it would represent a record high return of age 5 fish.
7. The 2003 McKenzie Leaburg Dam forecast of 5,100 is based on the expected return of 109,800, harvest of 30,200 fish below Willamette Falls (30% harvest rate on hatchery fish and 5% impact on wild fish), 12,800 fish into the Clackamas River, 800 fish lost to mortality below the falls, 66,000 fish to Willamette Falls, and 7.7% Leaburg count of the falls passage.
8. The 2003 Clackamas North Fork Dam forecast of 4,000 is based on a recent average conversion rate (37.1% of the Clackamas turnoff) and an expected 15% harvest rate on hatchery fish in the Clackamas River and 2% impact on wild fish in the Clackamas River.

The 2002 preseason forecast developed by ODFW was for a return of 73,800 fish entering the Columbia River. The wild portion of the run was estimated preseason at 10% or 7,380 fish (Melcher 2001). The primary basins that continue to support natural production of spring chinook are the Clackamas, North Santiam, and McKenzie rivers; and the McKenzie is considered to be the most important of these. These three streams were sampled for wild fish escapement in 2002. When considering fishery impacts and transit mortality estimates prior to escapement sampling areas it does appear that the actual 2002 return of 121,700 was indeed about 10% wild or about 12,200 fish to the mouth of the Columbia River. More accurate accounting should occur in 2003 when sport fishery sampling programs in upper river tributaries are implemented. Additionally, 6-year-old fish will return as mass marked in 2003. Mass marking of Willamette River spring chinook began with the 1997 brood.

The under-forecast in 2002 continued a trend begun in 1997. Forecasts have generally under-predicted when the run was increasing and over-predicted when the run was decreasing (Figure 2).

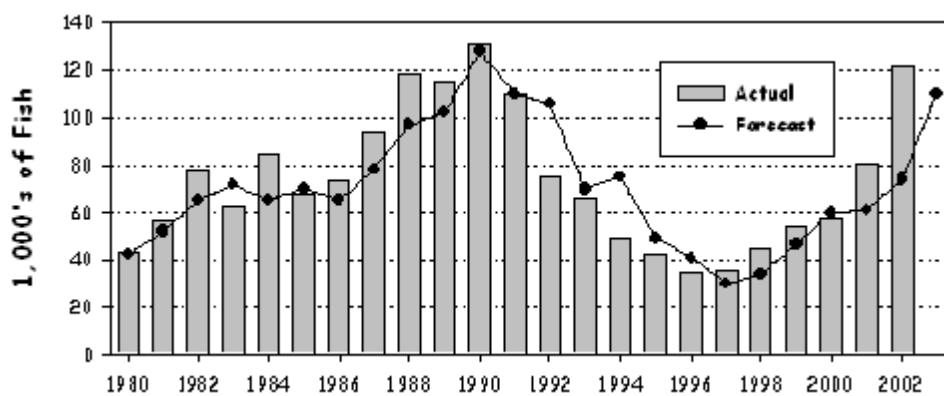


Figure 2. Predicted and observed Willamette spring chinook returns to the Columbia River, 1980-2003.

The 2002 return was comprised of the following age classes (Table 2).

	<u>No.</u>	<u>%</u>
Age 3	1,547	1.3
Age 4	88,338	72.6
Age 5	31,168	25.6
Age 6	<u>655</u>	<u>0.5</u>
Total	121,708	100.0

The return of 88,300 Age 4 fish was a record high in the database that began in the 1950s.

Clackamas River Return

The return to the Clackamas River in 2002 was 14,400 fish, the largest return on record (Table 3). The return was comprised of the following age classes (Table 2).

	<u>No.</u>	<u>%</u>
Age 3	264	1.8
Age 4	9,557	66.6
Age 5	4,497	31.3
Age 6	<u>38</u>	<u>0.3</u>
Total	14,356	100.0

The preseason forecast was for a return of 12,800 fish to the mouth of the Clackamas River (Melcher 2001) with about 15% of the return being wild or 1,920 wild fish.

The return to North Fork Dam in 2002 was 5,329 fish, a record high count. (Table 3 and Figure 3). Sampling by Portland General Electric staff showed the return to be 2,281 primarily nonadipose fin-clipped wild fish and 3,048 adipose fin-clipped hatchery fish. The adipose fin-clipped fish were recycled downstream through the sport fishery and not allowed to pass the dam into the natural spawn area. When considering the North Fork Dam count, natural spawn below the dam, and fishery-related mortalities, it appears the wild return entering the Clackamas River in 2002 was about 2,400 fish or 17% of the 14,400 run entering the Clackamas River.

Table 3. Estimated return of spring chinook to the Clackamas River, 1979-2002.

Year	L. Clackamas Sport Catch	North Fork Dam Count	Natural Spawn Bel. N. Fork Dam	Hatchery Return		Total Return
				Eagle Ck. NFH	Clackamas	
1979	1,226	838	159	2,803	0	5,026
1980	3,165	2,172	624	1,480	1,024	8,465
1981	2,334	3,162	654	812	1,065	8,027
1982	2,463	3,119	203	905	573	7,263
1983	4,532	2,685	770	522	1,923	10,432
1984	4,300	2,835	600	1,032	2,521	11,288
1985	2,478	1,834	635	726	944	6,617
1986	3,900	1,960	600	661	776	7,897
1987	3,186	2,425	868	1,338	1,005	8,822
1988	2,720	3,140	201	1,373	1,253	8,687
1989	2,900	2,938	600	1,137	865	8,440
1990	4,710	3,444	600	869	1,847	11,470
1991	3,834	4,659	500	88	2,776	11,857
1992	2,697	3,553	750	0	4,535	11,535
1993	2,963	3,090	200	0	4,635	10,888
1994	1,541	2,174	100	9	3,675	7,499
1995	1,708	1,659	150	19	3,112	6,648
1996	1,869	903	100	2	3,044	5,918
1997	1,732	1,267	150	0	2,670	5,819
1998	1,302	1,431	100	4	4,530	7,367
1999	1,890	878	100	4	4,562	7,444
2000	1,179	2,277	20	9	4,296	7,781
2001	783 ^{1/}	3,748	50	3	6,155	10,800
2002	2,565 ^{2/}	5,329 ^{3/}	50	18	6,256	14,358

^{1/} An additional 544 nonadipose fin-clipped fish were released. The release mortality estimate is 61 fish.

^{2/} An additional 1,145 nonadipose fin-clipped fish were released. The release mortality estimate is 140 (126 wild fish).

^{3/} A total of 2,281 nonadipose fin-clipped fish were passed upstream. A total of 3,048 adipose fin-clipped hatchery fish were recycled downstream for additional sport fishing opportunity.

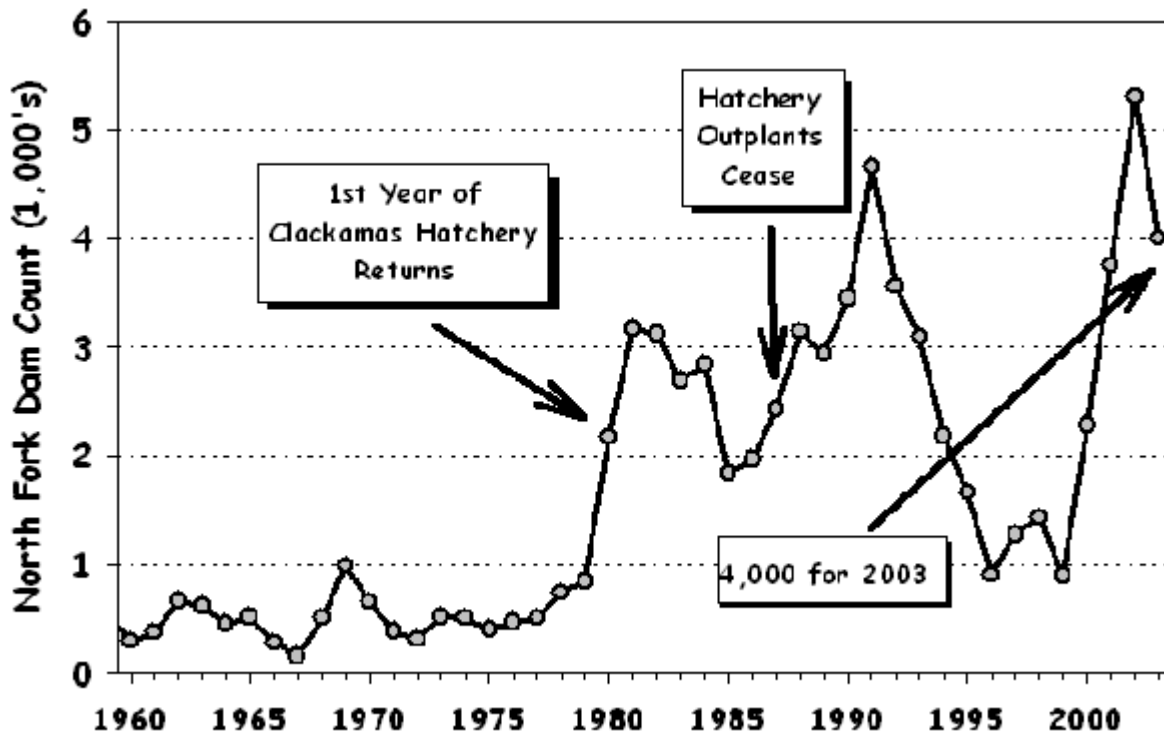


Figure 3. Historic spring chinook returns to North Fork Dam (Clackamas River) and this year's forecast.

An escapement of 2,300 wild fish at North Fork Dam is in the range of escapement goals contained in the Clackamas River Basin Fish Management Plan for Spring Chinook (ODFW 1998).

North Santiam River

The 2002 North Santiam spring chinook return was monitored at Upper and Lower Bennett dams by ODFW District and Research staff. Nearly all hatchery fish returning in 2002 were adipose finclipped. Also all hatchery fish were thermally otolith marked (Schroeder et al., 2002). An estimated 7,844 adult spring chinook passed Bennett dams. A total of 1,264 (16.1%) were unmarked. Otoliths were collected during natural spawn surveys from unmarked carcasses. Readings are not complete yet, but likely the number of naturally produced spring chinook will number in the mid hundreds.

Redd counts of spring chinook salmon in the North Santiam River dropped in 2002 but are still well above average since counting was standardized in 1996 (Table 4). Redd counts in the Little North Fork Santiam increased in 2002 but were likely an artifact of a 399 adult release (all unmarked) made prior to the survey.

Table 4. Redd counts of spring chinook salmon in the North Santiam River, 1996-2002.

Area	Redd Counts						
	1996	1997	1998	1999	2000	2001	2002
Mainstem North Santiam: Stayton to Minto	137	134	155	215	272	308	276
Little North Fork of the Santiam	<u>0</u>	<u>10</u>	<u>39</u>	<u>11</u>	<u>22</u>	<u>18</u>	<u>30</u>
Total	137	144	194	226	294	326	306

McKenzie River

The 2002 return to the McKenzie River was 16,072 fish, the largest return since accounting of the run size was initiated in 1970 (Table 5 and Figure 4). Monitoring of the wild return occurs at Leaburg Dam and in natural spawn surveys below Leaburg Dam.

The 2002 Leaburg Dam count was 6,087 fish, the largest count since 1990. The vast majority of McKenzie hatchery spring chinook returning in 2002 were adipose fin-clipped. The Leaburg count was comprised of 4,223 nonadipose fin-clipped fish and 2,551 adipose fin-clipped hatchery fish. An additional 690 hatchery fish were removed and not allowed to pass the dam into natural spawn areas. These fish were hauled and released primarily above Cougar Dam into the South Fork McKenzie.

An analysis of the Leaburg Dam count by ODFW District staff provides estimates of the number of wild and hatchery fish in the 2002 count. This analysis was initiated in 1996. The preliminary 2002 estimate of wild fish passing Leaburg Dam is 4,104 fish, the highest count in the database and likely the largest passage of wild fish since 1990 (Table 6). The wild fish escapement of 4,104 is within the escapement goal range of 3,000-5,000 in the McKenzie River Basin Fish Management Plan for Spring Chinook (ODFW 1998).

Table 5. Estimated return of spring chinook to the McKenzie River, 1970-2002.

Run Year	Leaburg Dam Count	McKenzie Hatchery Return	Sport Catch			Est. Natural Spawn Below Leaburg Dam ^{1/}		Total Return
			Above Leaburg Dam	Below Leaburg Dam	Total	Redds	No. Fish	
1970	2,991	20	--		525	278	1,251	4,787
1971	3,602	232	--		621	415	1,868	6,323
1972	1,547	301	--		1,125	177	797	3,770
1973	3,870	56	--		1,510	556	2,502	7,938
1974	3,717	0	--		1,022	689	3,101	7,840
1975	1,374	0	--		461	346	1,557	3,392
1976	1,899	396	--		139	409	1,841	4,275
1977	2,714	1,517	--		1,071	850	3,825	9,127
1978	3,058	1,464	--		924	599	2,696	8,142
1979	1,219	798	--		303	155	698	3,018
1980	1,980	807	--		381	219	986	4,154
1981	1,078	784	--		493	282	1,269	3,624
1982	2,241	1,460	--		627	241	1,085	5,413
1983	1,561	821	15	206	221	172	774	3,377
1984	1,000	1,901	51	567	618	271	1,220	4,739
1985	825	1,923	8	459	467	381	1,715	4,930
1986	2,061	1,705	29	354	383	315	1,418	5,567
1987	3,455	1,593	29	1,339	1,368	212	954	7,370
1988	6,753	2,487	86	1,133	1,219	484	2,178	12,637
1989	3,981	3,154	134	1,730	1,864	228	1,026	10,025
1990	7,226	3,206	315	1,387	1,702	160	720	12,854
1991	4,359	4,483	64	1,922	1,986	161	725	11,553
1992	3,816	3,407	81	1,195	1,276	106	477	8,976
1993	3,629	2,051	80	1,761	1,841	142	639	8,160
1994	1,526	701	13	486	499	59	266	2,992
1995	1,622	1,135	24	84	108 ^{2/}	66	297	3,162
1996	1,445	1,573	58	244	302 ^{2/}	71	320	3,640
1997	1,176	1,524	0	0	0 ^{3/}	90	405	3,105
1998	1,874	1,690	0	0	0 ^{3/}	95	428	3,992
1999	1,909	2,279	0	0	0 ^{3/}	82	369	4,557
2000	2,657	3,553	0	0	0 ^{3/}	132	594	6,804
2001	4,428	3,920	0	750	750 ^{2/}	100	450	9,548
2002 ^{4/}	6,087 ^{5/}	6,832	0	1,500	1,500 ^{2/}	214	963	16,072
1970-02 Average	2,808	1,751	49	756	767	265	1,194	6,541
1994-02 Average	2,525	2,579	11	340	351	101	455	5,986

^{1/} Estimated Natural Spawn below Leaburg Dam = No. of Redds below Leaburg Dam X 4.5 Fish/Redd.

^{2/} Adipose fin-clipped hatchery fish only allowed to be retained.

^{3/} Closed season.

^{4/} Preliminary.

^{5/} An additional 690 adipose fin-clipped hatchery fish were removed from Leaburg Dam ladder and hauled and released primarily above Cougar Dam into the South Fork McKenzie River.

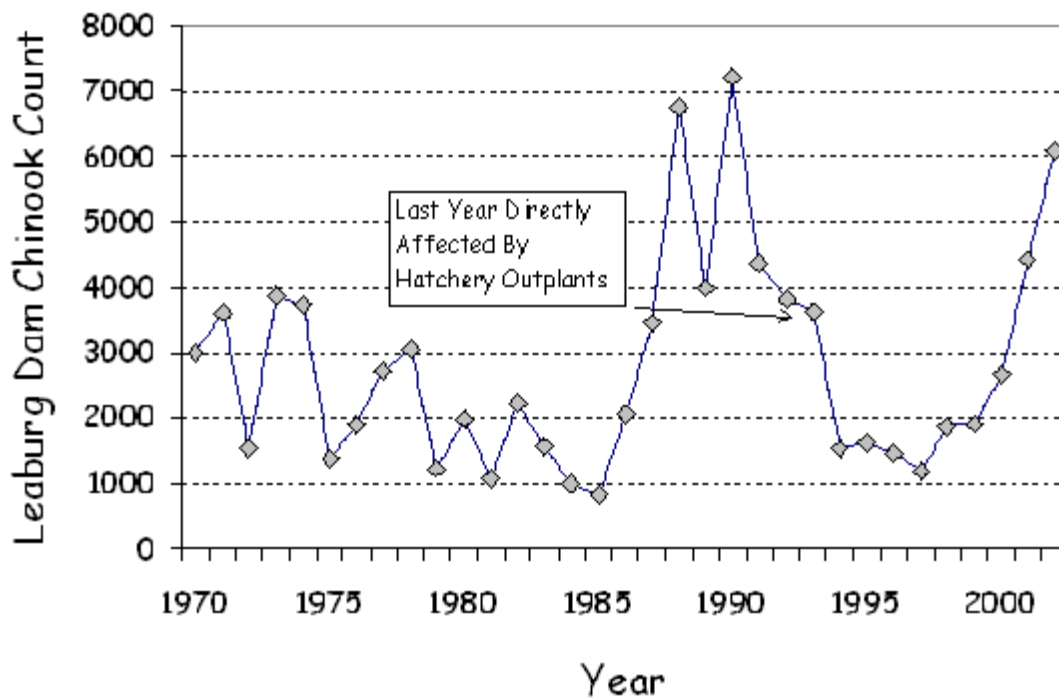


Figure 4. Historic spring chinook returns to Leaburg Dam (McKenzie River).

Table 6. Spring chinook counts at Leaburg Dam on the McKenzie River, 1994-2001.

<i>Year</i>	<i>Wild</i>		<i>Hatchery</i>		<i>Total</i>
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	
1994	825	54	701	46	1,526
1995	933	58	689	42	1,622
1996	1,105	76	340	24	1,445
1997	991	84	185	16	1,176
1998	1,415	76	459	24	1,874
1999	1,383	72	526	28	1,909
2000	1,985	75	672	25	2,657
2001	3,380	76	1,048	24	4,428
2002 ^{1/}	4,104	67	1,983	33	6,087 ^{2/}

^{1/} Preliminary.

^{2/} An additional 690 adipose fin-clipped hatchery fish were removed from Leaburg Dam ladder.

2002 Fisheries

The FMEP calls for full implementation of selective fisheries for hatchery spring chinook. The year 2001 was the first fisheries were managed under the FMEP. Only spring chinook that were adipose finclipped were allowed to be retained in all freshwater fisheries beginning in 2002. All unmarked, wild fish were required to be released unharmed. The goal of Willamette Basin fishery management for spring chinook is to limit fishery impacts of wild fish to levels which ensure the survival and rebuilding of wild populations. An annual average impact rate of 15% or less in combined freshwater fisheries in the Willamette Basin and lower Columbia will achieve this goal. Fisheries in 2002 and expectations for 2003 are described in (ODFW/WDFW 2003).

Willamette spring chinook fisheries in 2002 were managed successfully within the 15% impact rate limit. Tables 7 and 8 provide 2002 catch estimates by fishery and fishery impact estimates on three populations of Willamette wild spring chinook. Spring chinook stock separations in Columbia River fisheries were made through visual stock identification and coded-wire-tag analyses (ODFW/WDFW 2003). The mortality rates for released fish in Columbia spring chinook fisheries is estimated to be 10% (personal communication C. LeFleur, Chair, *U.S. v Oregon* Technical Advisory Committee). In the Willamette Basin, the lower Willamette and lower Clackamas fisheries were sampled. Sport fisheries above Willamette Falls were not sampled in 2002 but are expected to be in 2003. Mortality rates for released fish in the sampled Willamette Basin fisheries are 12.2% (Lindsay et al. 2003). The percentage fisheries impact on wild Willamette River spring chinook in 2002 was 11.4% for Clackamas, 9.3% for North Santiam, and 7.8% for McKenzie populations.

Lower Columbia River Commercial Fishery

The 2002 lower Columbia spring chinook commercial fishery was selective to adipose fin-clipped hatchery fish. All nonadipose fin-clipped fish were released. This was the inaugural year for the selective commercial fishery. The fishery was restricted to 5-1/2" maximum stretch mesh size tangle nets, shortened nets, 45-minute maximum drift time, and recovery boxes to revitalize lethargic and bleeding fish. The fishery was managed for impacts to ESA-listed wild Willamette spring chinook, listed spring chinook destined for above Bonneville Dam, and listed steelhead. Additionally allocation of Willamette hatchery spring chinook between the recreational and commercial was in place (ODFW/WDFW 2003).

The 2002 tangle net fishery consisted of 15 fishing periods (14-72 hours) during February 25 through March 27, from the mouth of the Columbia upstream to Beacon Rock, located 5 miles below Bonneville Dam. The fishery was heavily sampled by on-board monitors and at places of sales of landed catch.

The fishery harvested 14,238 hatchery spring chinook, released 14,095 nonadipose fin-clipped spring chinook. The estimated Willamette spring chinook proportions were 5,357 hatchery fish landed and 980 unmarked fish released. The chinook release mortality rate used in 2002 tangle net management was 10%. The estimated impact of Willamette wild spring chinook is 93 fish, 0.76% of the return.

Table 7. 2002 Willamette spring chinook freshwater catches and impacts on wild fish returns.

Fishery	Catch ^{1/}		Wild Fish Mortalities ^{3/}	Percentage Impact on Wild Return ^{4/}
	Kept	Released ^{2/}		
Lower Columbia Commercial	5,357	980	93	0.76
Select Area Commercial	1,942	0	194	1.59
Lower Columbia Sport	5,069	1,350	128	1.05
Lower Willamette Sport	<u>10,457</u>	<u>3,178</u>	<u>369</u>	<u>3.03</u>
Total	22,825	5,508	784	6.43
Clackamas Sport	2,565	1,145	126	4.90
Upper Willamette Sport	NA	NA	NA	(.3) ^{5/}
North Santiam Sport	NA	NA	NA	(2.5) ^{5/}
McKenzie Sport	NA	NA	NA	(1.0) ^{5/}
<u>Totals by Population</u>				
Clackamas				11.33
North Santiam				9.23
McKenzie				7.73

^{1/} Estimates from formal sampling programs. Fisheries denoted as NA were not sampled in 2002.

^{2/} In 2002 about 95% (90% in the Clackamas River) of the released catch were wild fish. The remaining percentages were nonadipose fin-clipped double-index tagged hatchery fish, missed or bad clips on hatchery fish, and nonadipose fin-clipped 6-year-old fish.

^{3/} Estimated release mortality rates are 10% in the lower Columbia fisheries and 12.2% in the lower Willamette and lower Clackamas fisheries.

^{4/} Aggregate wild return estimated at 12,170 fish at the mouth of the Columbia River (10% of the actual 2002 Willamette spring chinook run size of 121,711). Wild return to the Clackamas River estimated at 2,407 fish (16.8% of the 14,358 Clackamas return) and 2,572 fish at the Columbia River mouth.

^{5/} Estimates from Table 4 of the FMEP.

Table 8. Freshwater fishery impact rates (percentages) on wild Willamette River spring chinook, 1981-2002.

	1981-97	1998	1999	2000	2001	2002
Spring Chinook Fishery						
Lower Columbia Commercial ^u	6.8	0.0	0.0	0.6	4.17	2.35
Lower Columbia Sport	2.5	0.1	0.0	0.4	0.68	1.05
Lower Willamette Sport	21.7	6.3	10.2	14.0	2.12	3.03
Clackamas Sport	22.9	26.5	22.8	13.6	1.49	4.90
Upper Willamette Sport	1.2	0.6	0.9	1.2	(0.3)	(0.3)
North Santiam Sport	16.5	22.7	21.7	2.0	(2.5)	(2.5)
McKenzie Sport	5.1	0.0	0.0	0.0	(1.0)	(1.0)
Totals by Population						
Clackamas	54.0	22.8	33.0	28.2	8.46	11.33
North Santiam	48.8	29.6	32.8	18.0	9.77	9.23
McKenzie	37.3	7.0	11.1	16.1	8.27	7.73

^u Includes mainstem salmon/sturgeon fisheries and Oregon Select Area fisheries.

Select Area Fisheries

Fisheries for net pen-reared spring chinook occurred in 2002 in Youngs Bay, Tongue Point/South Channel, and Blind Slough/Knappa Slough. Select Area fisheries were not restricted to adipose fin-clipped fish in 2002. These off-channel net pen and fishing sites are dominated by returns of local spring chinook. A total of 11,900 spring chinook were caught with an incidental catch of 1,942 Willamette spring chinook. The estimated impact on Willamette wild spring chinook was 194 fish or 1.59% of the return. The proportion of nonlocalized fish landed in 2002 was higher than average. Releases of net pen-reared spring chinook are now of adipose fin-clipped fish. It is expected Select Area fisheries in 2004 will be restricted to retention of marked hatchery fish only.

Lower Columbia Sport Fishery

For only the second time since 1977, the lower Columbia River sport fishery was open the majority of the spring to adipose fin-clipped hatchery spring chinook targeting an upriver spring chinook return of 295,100 fish, the second largest run back to 1938. The fishing area was expanded to include the area from the mouth upstream to McNary Dam. For many years the fishery was restricted to below the I-5 Bridge and closed April 1 or earlier to focus the fishery on lower river stocks of spring chinook.

The 2003 lower Columbia fishery was open Jan. 1-Apr. 28 and May 5-15 with a two adult chinook daily bag limit and restricted to retention of adipose fin-clipped spring chinook. The 6-day closure was necessary to not exceed the allowed fishery impact to ESA-listed upriver spring chinook. The lower Columbia fishery produced 175,100 angler trips and retained 20,500 adipose fin-clipped spring chinook and released 14,000 nonclipped fish. An estimated 5,069 adipose fin-clipped Willamette hatchery fish were retained and 1,350 nonclipped fish were released. The estimated impact on Willamette wild spring chinook was 128 fish or 1.05% of the return.

Lower Willamette Sport Fishery

The 2002 lower Willamette sport fishery was open seven days per week the entire year to adipose fin-clipped chinook. This was the first year of full implementation of a selective spring chinook fishery. Good water conditions prevailed and angling occurred during much of the spring chinook migration through the lower Willamette, however, the spring chinook fishery underway on the lower Columbia in April and May drew much angler effort away from the lower Willamette. All 2002 returning age 3 through age 5 hatchery fish were mass marked with an adipose finclip. Only a portion of the age 6 fish were clipped. Age 6 fish in 2002 comprised only 0.5% of the return.

ODFW Research and District staff recently completed a study of the hooking mortality in the lower Willamette sport fishery during 1998-2000 (Lindsay et al. 2003). Estimates of hooking mortality by anatomical hook locations were made from catch and release of sport caught fish immediately below Willamette Falls and compared to uncaught fish in a control situation from a trap in Willamette Falls fishway. Meanwhile, ODFW fish checkers in the lower Willamette sport fishery were noting anatomical locations of hooking in landed catch. Applying the estimates of hooking mortality rates made at Willamette Falls to the distribution of hook locations in the sport fishery provides an estimated 12.2% catch and release hooking mortality in the lower Willamette river sport fishery. The 12.2% rate will be used beginning with 2002 Willamette spring chinook fishery management to estimate the fishery impact on released fish in the lower Willamette and Clackamas river sport fisheries.

A total of 89,400 angler trips were made to catch 13,635 spring chinook; 10,457 (76.7%) were kept adipose fin-clipped fish and 3,178 (23.3%) were released nonadipose fin-clipped fish. The estimated impact on Willamette wild spring chinook was 369 fish or 3.03% of the return.

Clackamas River Sport Fishery

The 2002 Clackamas River spring chinook sport fishery was open seven days per week the entire year and was restricted to adipose fin-clipped chinook. Age 6 spring chinook returning in 2002 were not mass marked with adipose finclips.

A total of 18,200 angler trips caught 3,710 spring chinook of which 2,565 (69.1%) were retained adipose fin-clipped fish and 1,145 (30.9%) were released nonadipose fin-clipped fish. The estimated impact on Clackamas wild spring chinook was 126 fish or 4.90% of the return to the mouth of the Columbia River (2,570 fish) or 5.23% of the return to the mouth of the Clackamas River (2,410 fish).

Upper Willamette Mainstem Sport Fishery

The 2002 upper Willamette mainstem sport fishery (from the Falls upstream to the mouth of the McKenzie River) was restricted to adipose fin-clipped chinook the entire year coincidental with implementation of the rule for the sport fisheries below Willamette Falls.

The sport fishery in the upper Willamette is much smaller than the fishery in the lower Willamette. Even though 83,100 spring chinook passed Willamette Falls, angler effort was low and success was poor in 2002. The impact on Willamette wild spring chinook in the upper Willamette was negligible and likely less than the 0.3% projected in Table 4 (p. 28) of the FMEP.

Upper Willamette Tributary Sport Fisheries

All sport fisheries throughout the Willamette Basin were restricted to retention of adipose fin-clipped spring chinook in 2002.

The upper Willamette tributary sport fisheries were not monitored in-season by ODFW staff. Catch estimates are forthcoming from angler-returned harvest tags.

Notwithstanding tributary catch estimates and wild fish impact analyses, it is likely the wild fish impacts in the sport fisheries of the North Santiam and McKenzie are similar to those projected in Table 4 (p. 28) of the FMEP. The projections for the North Santiam and McKenzie rivers were 2.5% and 1.0% of the forecasted wild returns to the mouth of the Columbia River.

2002 Wild Fish Impacts

The estimated wild fish impact totals by population from the 2002 freshwater fisheries are 11.33%, 9.23%, and 7.73% for the Clackamas, North Santiam, and McKenzie populations, respectively (Table 7). These estimates are below the 15% limits established in the FMEP. Fishery impact rates since 2001 are a small fraction of the average rates of 37-54% during fisheries of 1981-1997 (Table 8).

2002 Angler Compliance With Regulations

Oregon State Police (OSP) Fish and Wildlife Division officers and their volunteers, with assistance from ODFW fish checkers, enforce Willamette spring chinook angling regulations. A priority task is enforcement of the regulation requiring release of nonadipose fin-clipped spring chinook in sport and commercial fisheries. Compliance with this regulation is high (personal communication with Lt. Dave Cleary, OSP, Salem). Very few citations were issued during conduct of the 2002 fisheries for violation of the wild fish release regulation.

ODFW and OSP staff congratulate the spring chinook fishing public for their high regard for rules protecting Willamette wild spring chinook.

Outlook for 2003 Willamette Spring Chinook Management

The 2003 Willamette spring chinook run size forecast is 109,800 including 10,980 (10%) wild fish (Melcher 2003) (Figure 2). The forecast includes a record high 89,200 age-5 fish. In December 2001, the Oregon Fish and Wildlife Commission established a long-term allocation plan between the commercial and sport fishery below Willamette Falls for sharing of the harvestable surplus of Willamette River hatchery spring chinook. The shares for 2003, based on the forecast of 98,800 hatchery fish, are 41,000 hatchery fish to the sport fishery below Willamette Falls and 17,500 hatchery fish to the Columbia River commercial fishery (Table 9). It is likely neither fishery will achieve their allocation and large surpluses of hatchery fish will accrue again in 2003.

All freshwater Willamette spring chinook fisheries will continue to be selective to adipose fin-clipped fish in 2003. All Willamette Basin sport fisheries are under permanent rule to be restricted to adipose fin-clipped fish and regulations are printed as such in the *2003 Oregon Sport Fishing Regulations* pamphlet.

The lower Columbia spring chinook sport fishery is currently open only through

March 31 below the I-5 Bridge. It is likely the fishery will be extended through May 15 up to the OR/WA border above McNary Dam. ODFW and WDFW fishery managers will meet in the Joint State Sport Fishery Forum immediately following the Columbia River Compact hearing February 6, 2003, at the Water Resources Education Center in Vancouver, Washington, to establish the fishery.

The Columbia River commercial fishery will be set at the February 6 and later Columbia River Compact hearings. The 2003 commercial fishery may include a mix of large-mesh gillnets to target age 5 Willamette spring chinook and limit steelhead handling, and 4-1/4" stretch mesh tangle nets. The commercial fishery will be required to use shortened nets with 45-minute maximum drift times. All lethargic or bleeding nonadipose fin-clipped spring chinook will be placed in on-board recovery boxes to be rehabilitated prior to release. ODFW and WDFW will conduct on-board monitoring of the fishery to estimate the effectiveness of fishing gear and catch of target and nontarget fish. Research will continue in 2003 to estimate long-term mortality of tangle net captured salmonids.

The 2003 cumulative freshwater fishery impact on Willamette wild spring chinook is expected to not exceed the average annual impact rate of 15% provided in the FMEP.

ODFW is currently working with the U.S. Army Corps of Engineers on proposals to implement measures in the upper Willamette hatchery and hydro biological opinions. The Corps will increase funding to ODFW in 2003 to conduct monitoring of fisheries, hatcheries, and wild fish returns. The Corps-funded activities, when added to ODFW's Sport Fish Restoration and State-funded activities, will provide for a more holistic monitoring program for Willamette spring chinook in 2003.

Steven D. King
ODFW
January 31, 2003

Table 9. Willamette spring chinook allocation schedule.

Predicted Willamette Hatchery Run Size	Hatchery Fish Escapement Targets			Number of Hatchery Fish Available	Harvest Shares Below the Falls			
	Willamette Falls Escapement Target	Clackamas Escapement Target	Combined Escapement Target		Harvest Shares Below the Falls			
					Sport		Commercial	
					Share	Catch	Share	Catch
23,000	20,000	3,000	23,000	0	<1%	<230	<1%	<230
24,000	20,000	3,000	23,000	1,000	100%	1,000	<1%	<240
25,000	20,000	3,000	23,000	2,000	100%	2,000	<1%	<250
26,000	20,000	3,000	23,000	3,000	100%	3,000	<1%	<260
27,000	20,000	3,000	23,000	4,000	100%	4,000	<1%	<270
28,000	20,000	3,000	23,000	5,000	100%	5,000	<1%	<280
29,000	20,000	3,000	23,000	6,000	100%	6,000	<1%	<290
30,000	20,000	3,000	23,000	7,000	100%	7,000	<1%	<300
31,000	20,000	3,000	23,000	8,000	100%	8,000	<1%	<310
32,000	20,000	3,000	23,000	9,000	100%	9,000	<1%	<320
33,000	20,000	3,000	23,000	10,000	100%	10,000	<1%	<330
34,000	20,000	3,000	23,000	11,000	100%	11,000	<1%	<340
35,000	20,000	3,000	23,000	12,000	100%	12,000	<1%	<350
36,000	20,000	3,000	23,000	13,000	100%	13,000	<1%	<360
37,000	20,000	3,000	23,000	14,000	100%	14,000	<1%	<370
38,000	20,000	3,000	23,000	15,000	100%	15,000	<1%	<380
39,000	20,000	3,000	23,000	16,000	100%	16,000	<1%	<390
40,000	22,000	3,300	25,300	14,700	85%	12,495	15%	2,205
41,000	22,000	3,300	25,300	15,700	85%	13,345	15%	2,355
42,000	22,000	3,300	25,300	16,700	85%	14,195	15%	2,505
43,000	22,000	3,300	25,300	17,700	85%	15,045	15%	2,655
44,000	22,000	3,300	25,300	18,700	85%	15,895	15%	2,805
45,000	22,000	3,300	25,300	19,700	80%	15,760	20%	3,940
46,000	22,000	3,300	25,300	20,700	80%	16,560	20%	4,140
47,000	22,000	3,300	25,300	21,700	80%	17,360	20%	4,340
48,000	22,000	3,300	25,300	22,700	80%	18,160	20%	4,540
49,000	22,000	3,300	25,300	23,700	80%	18,960	20%	4,740
50,000	24,000	3,600	27,600	22,400	76%	17,024	24%	5,376
51,000	24,000	3,600	27,600	23,400	76%	17,784	24%	5,616
52,000	24,000	3,600	27,600	24,400	76%	18,544	24%	5,856
53,000	24,000	3,600	27,600	25,400	76%	19,304	24%	6,096
54,000	24,000	3,600	27,600	26,400	76%	20,064	24%	6,336
55,000	24,000	3,600	27,600	27,400	76%	20,824	24%	6,576
56,000	24,000	3,600	27,600	28,400	76%	21,584	24%	6,816
57,000	24,000	3,600	27,600	29,400	76%	22,344	24%	7,056
58,000	24,000	3,600	27,600	30,400	76%	23,104	24%	7,296
59,000	24,000	3,600	27,600	31,400	76%	23,864	24%	7,536
60,000	26,500	4,000	30,500	29,500	73%	21,535	27%	7,965
61,000	26,500	4,000	30,500	30,500	73%	22,265	27%	8,235
62,000	26,500	4,000	30,500	31,500	73%	22,995	27%	8,505
63,000	26,500	4,000	30,500	32,500	73%	23,725	27%	8,775
64,000	26,500	4,000	30,500	33,500	73%	24,455	27%	9,045
65,000	26,500	4,000	30,500	34,500	73%	25,185	27%	9,315
66,000	26,500	4,000	30,500	35,500	73%	25,915	27%	9,585
67,000	26,500	4,000	30,500	36,500	73%	26,645	27%	9,855
68,000	26,500	4,000	30,500	37,500	73%	27,375	27%	10,125
69,000	26,500	4,000	30,500	38,500	73%	28,105	27%	10,395

Table 9 Continued, Next Page

Table 9. Willamette spring chinook allocation schedule. (Continued)

Predicted Willamette Hatchery Run Size	Hatchery Fish Escapement Targets			Number of Hatchery Fish Available	Harvest Shares Below the Falls			
	Willamette Falls	Clackamas	Combined		Below the Falls			
	Escapement	Escapement	Escapement	Sport		Commercial		
	Target	Target	Target	Share	Catch	Share	Catch	
70,000	29,000	4,400	33,400	36,600	73%	26,718	27%	9,882
71,000	29,000	4,400	33,400	37,600	73%	27,448	27%	10,152
72,000	29,000	4,400	33,400	38,600	73%	28,178	27%	10,422
73,000	29,000	4,400	33,400	39,600	73%	28,908	27%	10,692
74,000	29,000	4,400	33,400	40,600	73%	29,638	27%	10,962
75,000	29,000	4,400	33,400	41,600	73%	30,368	27%	11,232
76,000	29,000	4,400	33,400	42,600	70%	29,820	30%	12,780
77,000	29,000	4,400	33,400	43,600	70%	30,520	30%	13,080
78,000	29,000	4,400	33,400	44,600	70%	31,220	30%	13,380
79,000	29,000	4,400	33,400	45,600	70%	31,920	30%	13,680
80,000	32,000	4,900	36,900	43,100	70%	30,170	30%	12,930
81,000	32,000	4,900	36,900	44,100	70%	30,870	30%	13,230
82,000	32,000	4,900	36,900	45,100	70%	31,570	30%	13,530
83,000	32,000	4,900	36,900	46,100	70%	32,270	30%	13,830
84,000	32,000	4,900	36,900	47,100	70%	32,970	30%	14,130
85,000	32,000	4,900	36,900	48,100	70%	33,670	30%	14,430
86,000	32,000	4,900	36,900	49,100	70%	34,370	30%	14,730
87,000	32,000	4,900	36,900	50,100	70%	35,070	30%	15,030
88,000	32,000	4,900	36,900	51,100	70%	35,770	30%	15,330
89,000	32,000	4,900	36,900	52,100	70%	36,470	30%	15,630
90,000	35,000	5,400	40,400	49,600	70%	34,720	30%	14,880
91,000	35,000	5,400	40,400	50,600	70%	35,420	30%	15,180
92,000	35,000	5,400	40,400	51,600	70%	36,120	30%	15,480
93,000	35,000	5,400	40,400	52,600	70%	36,820	30%	15,780
94,000	35,000	5,400	40,400	53,600	70%	37,520	30%	16,080
95,000	35,000	5,400	40,400	54,600	70%	38,220	30%	16,380
96,000	35,000	5,400	40,400	55,600	70%	38,920	30%	16,680
97,000	35,000	5,400	40,400	56,600	70%	39,620	30%	16,980
98,000	35,000	5,400	40,400	57,600	70%	40,320	30%	17,280
99,000	35,000	5,400	40,400	58,600	70%	41,020	30%	17,580
100,000	39,000	6,000	45,000	55,000	70%	38,500	30%	16,500
101,000	39,000	6,000	45,000	56,000	70%	39,200	30%	16,800
102,000	39,000	6,000	45,000	57,000	70%	39,900	30%	17,100
103,000	39,000	6,000	45,000	58,000	70%	40,600	30%	17,400
104,000	39,000	6,000	45,000	59,000	70%	41,300	30%	17,700
105,000	39,000	6,000	45,000	60,000	70%	42,000	30%	18,000
106,000	39,000	6,000	45,000	61,000	70%	42,700	30%	18,300
107,000	39,000	6,000	45,000	62,000	70%	43,400	30%	18,600
108,000	39,000	6,000	45,000	63,000	70%	44,100	30%	18,900
109,000	39,000	6,000	45,000	64,000	70%	44,800	30%	19,200
110,000	39,000	6,000	45,000	65,000	70%	45,500	30%	19,500

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